Hawaii H38 and Hawaii H68: Hawaiian Sweet Corn Hybrids

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COVER PHOTO: Philip and Pamela Brewbaker sample the new Hawaiian sweet corn hybrid, Hawaii H68.

CONTENTS

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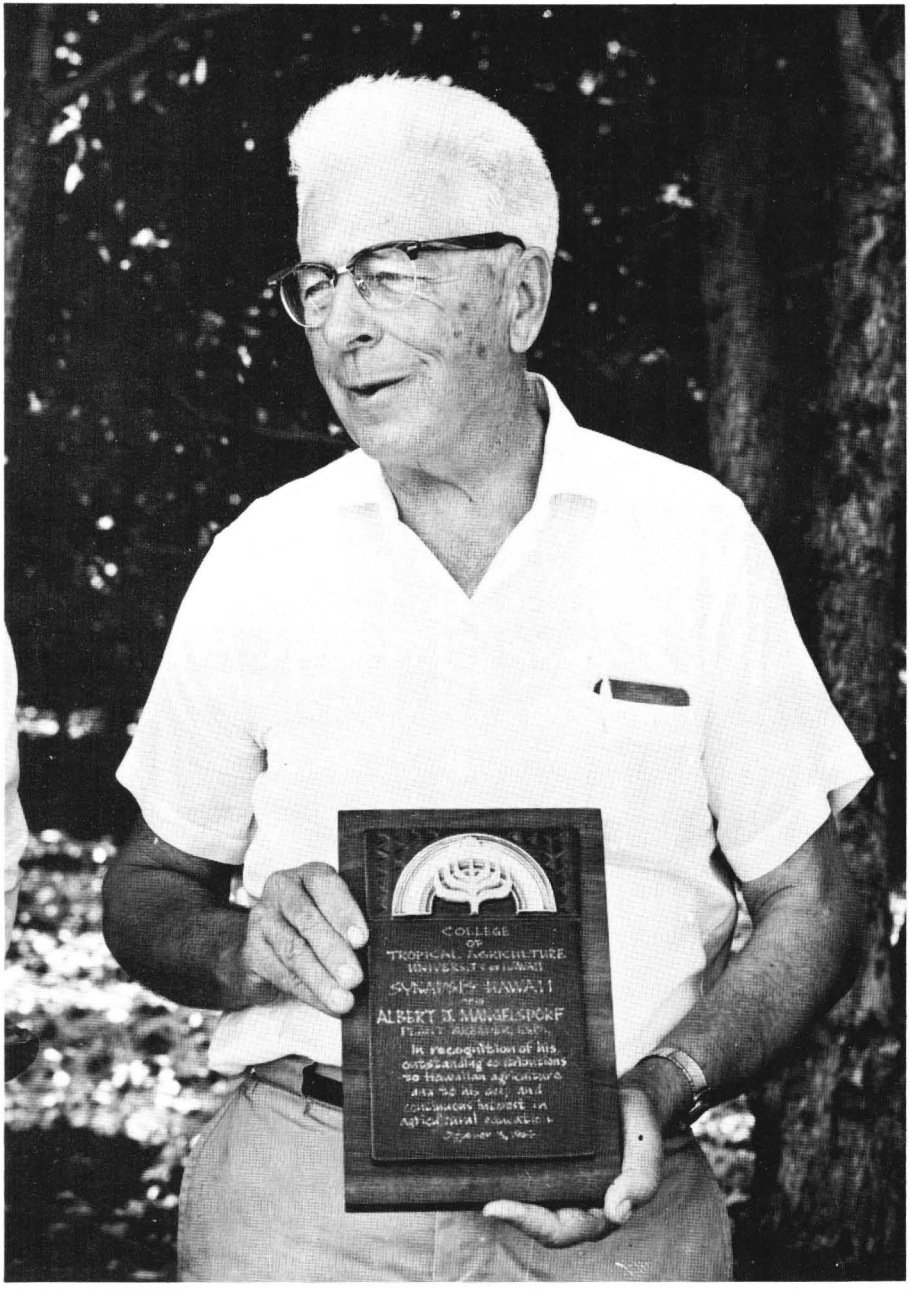

FIGURE 1. Dr. Albert J. Mangelsdorf, breeder of Hawaiian Sugar sweet corn, and noted sugarcane geneticist and breeder.

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Hawaii H38 and Hawaii H68 are the first sweet corn hybrids to be released by the Hawaii Agricultural Experiment Station and were bred for year-round adaptability to the tropics. They derive a high winter-yielding capacity and resistance to earworms and mosaic from a new Hawaiian inbred, AA8. High quality is contributed by mainland inbred parents P39 and 442. Hawaii H38 and Hawaii H68 significantly outyield mainland hybrids through most of the year in Hawaii and have performed creditably in commercial tests.

ORIGIN

Hawaii H38 and Hawaii H68 are single-cross sweet corn hybrids produced by the author and evaluated throughout the State of Hawaii with the assistance of Dr. J. A. Crozier and Dr. P. J. Ito of the Hawaii Agricultural Experiment Station. The hybrids are derived from crosses of a new Hawaiian inbred, AA8, with mainland inbreds, P39 and 442, respectively:

Hybrid	*Seed Parent*	*Male Parent*
Hawaii H38	AA8 (University of Hawaii)	P39 (Purdue University)
Hawaii H68	AA8 (University of Hawaii)	442 (University of Illinois)

The Hawaiian inbred AA8 was bred from the variety, Hawaiian Sugar,[1] and has been an exceptionally good parent for hybrids with mainland inbred lines. Hawaiian Sugar is probably the best tropically adapted yellow sweet corn variety, and was bred by Dr. Albert J. Mangelsdorf (Figure 1) of the Hawaiian Sugar Planters' Association from crosses of USDA34 and Golden Cross Bantam. Illustrating the genetic diversity between Hawaiian and mainland lines is the fact that Golden Cross Bantam is dwarfed to 2 or 3 feet in height under midwinter conditions in the warm tropics, while Hawaiian Sugar fails to flower at all, or flowers too late for commercial harvest when grown in the Corn Belt.

[1]A description of this breeding program appears in Brewbaker, James L., 1965, Breeding Sweet Corn Hybrids for Hawaii, *Hawaii Farm Science* 14(1): 1–4.

DESCRIPTION OF HAWAII H38 AND ITS PARENTS

Hawaii H38 is a highly productive hybrid selected especially for its exceptional tenderness and sweetness (see Table 1). It is early by Hawaiian Sugar standards, maturing in about 70 days, and should be picked within 18 or 19 days of silk emergence for maximum quality. Ears are small (5½ to 7 inches) with slender cobs, tight husks, and short husk tips (Figures 2, 3). Plants usually bear two marketable ears and often have a third ear. Quality, uniformity, and yield of Hawaii H38 exceed those of the variety, Hawaiian Sugar. Hawaii H38 is quite resistant to earworms and sweet corn mosaic,[2] but relatively susceptible to *Helminthosporium* leaf blight (*H. turcicum*). Compared with mainland hybrids that have been evaluated in Hawaii,[3] Hawaii H38 and Hawaii H68 excel in earworm and mosaic resistance.

TABLE 1. Plant and ear characters of Hawaiian sweet corn hybrids Hawaii H38 and Hawaii H68 and their parents under typical summer lowland conditions in Hawaii. Ratings follow those of Brewbaker et al., 1966 (see footnote 3), with 1 best, 5 worst

Character	Hawaii H38	Hawaii H68	P39	442	AA8
Days to harvest	72	75	65	69	75
Plant height (feet)	7.5	8.5	4.0	6.5	7.0
Height to base upper ear (feet)	3.0	3.5	1.5	3.0	2.5
Number of leaves per plant	14	14–15	9–10	13	14
Number of suckers per plant	1.5	0	3.5	1.5	0
Number of ears per plant	2.5	2.0	2.5	2.0	1.5
Ear length (inches)	6.5	7.5	4.0	4.5	5.5
Kernel row number	12–14	14–16	12	12	12
Length of husk leaves (inches)	2.0	0.5	4.0	2.0	0.0
Ear weight, unhusked (pounds)	0.52	0.62	—	—	—
Ear weight, husked (pounds)	0.31	0.36	—	—	—
Silk color (outside)	Green	Red	Green	Red	Green
Silk color (inside)	White	White	White	Tan	White
Anther and Glume color	Green	Red	Green	Red	Green
Resistance to earworm	1.5	1.5	4	3	1.5
Resistance to blight	3–4	3–4	5	5	3
Resistance to corn mosaic	2	2	5	5	1

The parents of Hawaii H38 are the respected Purdue inbred, P39, and the new University of Hawaii inbred, AA8 (see Table 1). P39 was bred from the variety, Golden Bantam, by Dr. Glenn M. Smith at Purdue University. P39 and its closely allied inbreds (IP39, P39-5, P39A, C30, etc.) grow 4 feet or less in Hawaii and tiller profusely in more or less dwarfed rosettes. Pollen production is good in summer months and is prolonged due to pollen release by flowering tillers. P39 is not a satisfactory seed parent in Hawaii. Winter stunt-

[2]Brewbaker, J. L., and F. Aquilizan. 1965. Genetics of resistance in maize to a mosaic-stripe virus transmitted by *Peregrinus maidis*. Crop Science 5(5): 412–415.

[3]Brewbaker, J. L., J. A. Crozier, Jr., P. J. Ito, and D. D. F. Williams. 1966. Performance trials of commercial sweet corn hybrids and varieties in Hawaii, 1962–1965. Hawaii Agricultural Experiment Station, Technical Progress Report No. 149. 22 pp.

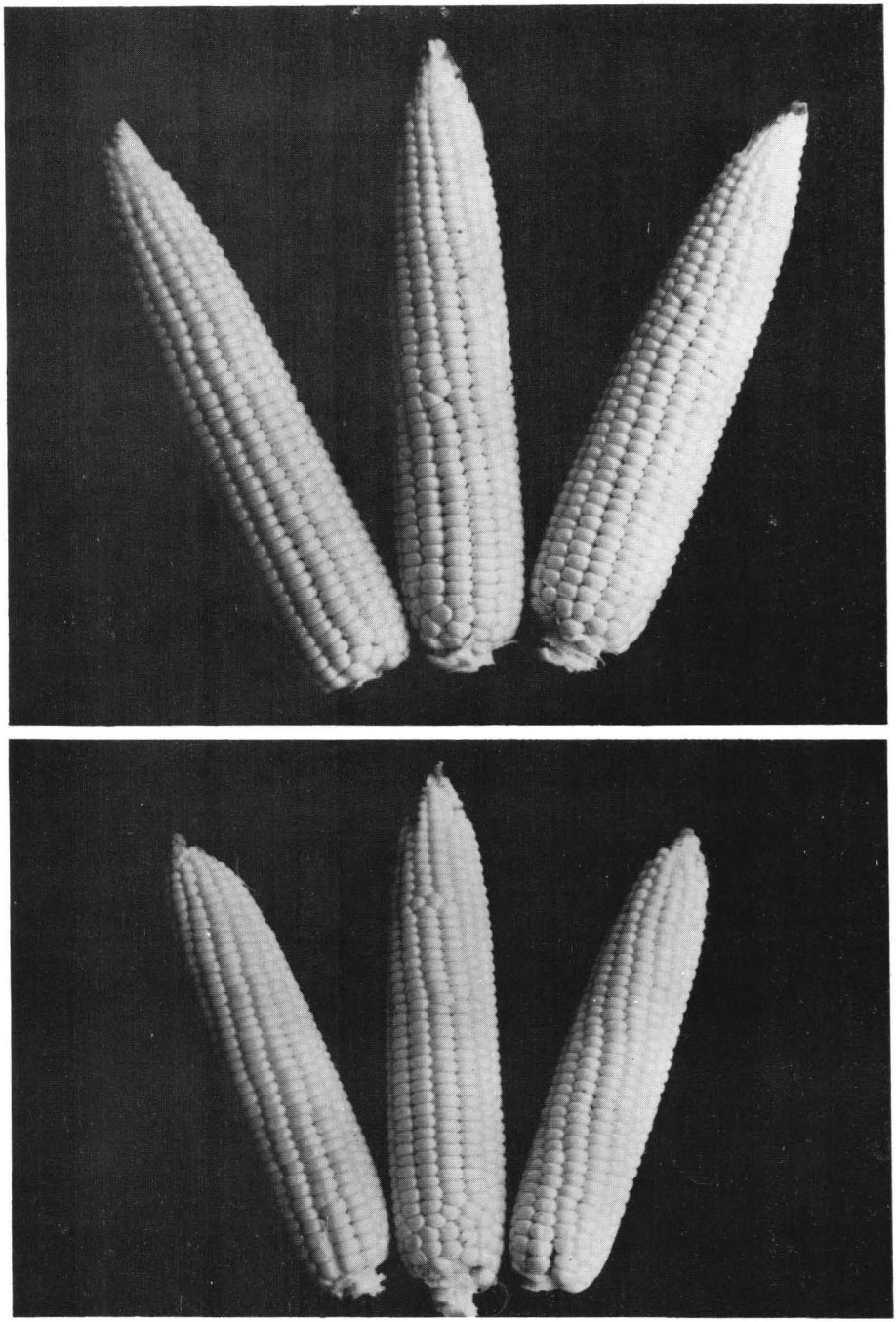

FIGURE 2. Husked ears of new Hawaiian sweet corn hybrids Hawaii H68 (above) and Hawaii H38 (below).

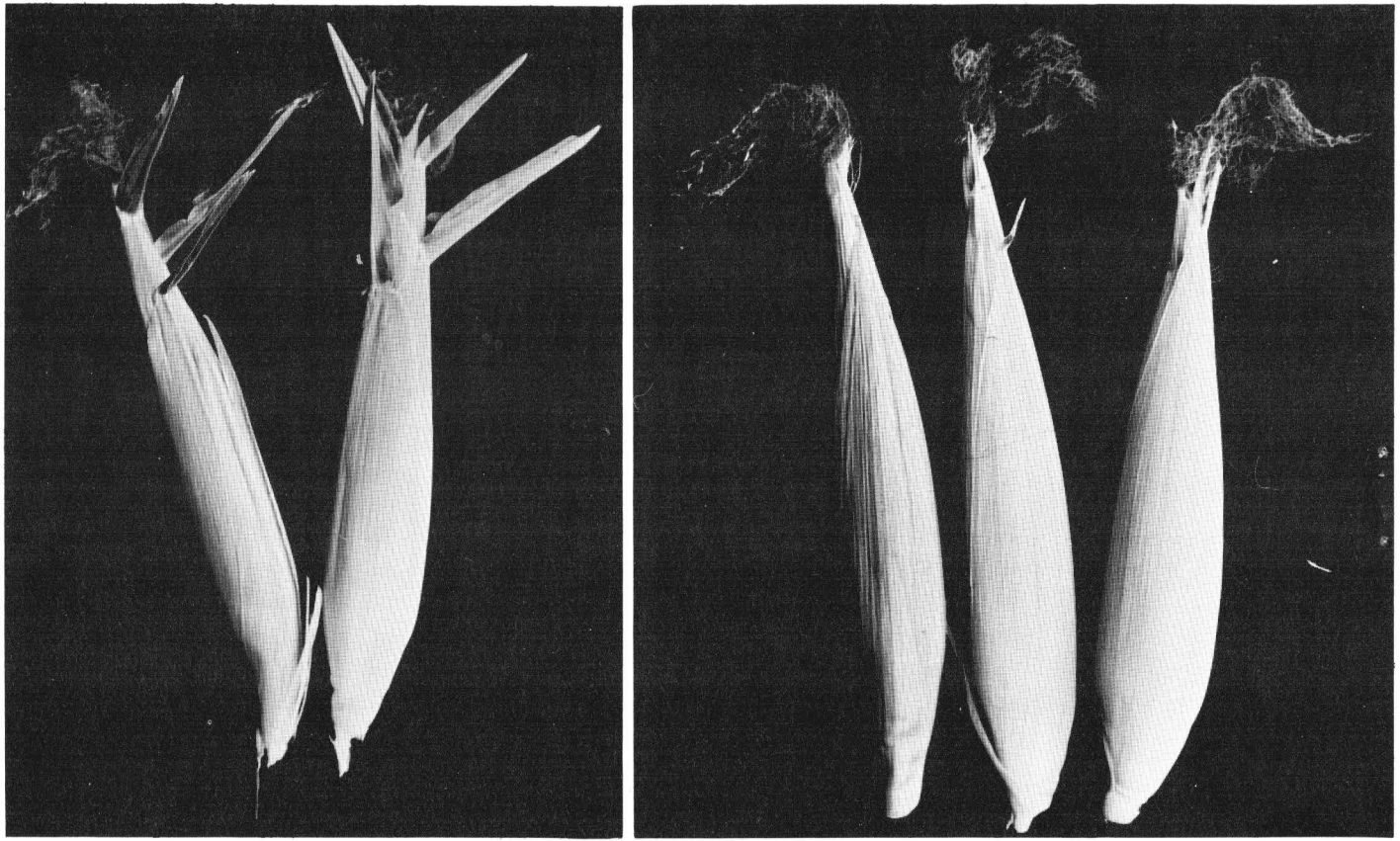

FIGURE 3. Unhusked ears of new Hawaiian sweet corn hybrids Hawaii H38 (left) and Hawaii H68 (right).

ing can reduce P39 to a 2-foot dwarf, and it is extremely susceptible to mosaic, earworm, and blight. AA8 (pedigree, A19-6-1-1-1-1) was inbred from the variety, Hawaiian Sugar, with which it shares the tolerance of tropical winter daylengths and high night temperatures, the resistance to mosaic, and the tight husk and earworm resistance. The inbreeding was initiated in 1960 by Dr. Donald C. McGuire of the Hawaii Agricultural Experiment Station and continued in 1961 by the author. Hawaiian Sugar was bred from crosses of a Puerto Rican sweet corn, USDA 34 (which was noted for its resistance to mosaic-stripe virus), and Golden Cross Bantam, whose parents are P39 and P51. AA8 makes an excellent seed parent for the production of hybrid Hawaii H38.

DESCRIPTION OF HAWAII H68 AND ITS PARENTS

Hawaii H68 is a productive hybrid selected especially for its comparatively large (6½- to 8-inch) ears and high quality. It is a tall hybrid, especially in summer months (Figure 4), and matures 1 to 4 days later than Hawaii H38. Yields of marketable ears on Hawaii H68 approach or equal Hawaii H38, but the ears are heavier and longer (Figure 2, Table 1), and have shorter husk tips (Figure 3). Resistance to pests and diseases is comparable to that of Hawaii H38. These two hybrids have performed creditably elsewhere in the tropics (e.g., Philippines, Guam, Puerto Rico).

The parents of Hawaii H68 are inbreds 442 (University of Illinois) and AA8 (University of Hawaii). The inbred 442 was bred by Dr. Walter A. Huelsen of the University of Illinois from crosses involving CC5, a field corn inbred, and Illinois 104c and 104q, inbreds from Narrow Grain Evergreen × Unknown Yellow. It is later, taller, and more vigorous in the tropics than most mainland inbreds. It bears few tillers and has two ears with comparatively tight husks and red silks. It is relatively susceptible to earworms and blight, and highly susceptible to mosaic. Hawaiian inbred AA8 has been described in the preceding section.

SEASONAL VARIATIONS IN PERFORMANCE, HAWAII H38 AND HAWAII H68

The principal reason for the failure of winter sweet corn production in Hawaii is the short daylength stunting of temperate hybrids. Plant heights are reduced about 50 percent in winter months and ear lengths are shortened measurably. Mosaic damage also increases in the winter, apparently as a result of increasing leafhopper populations. Earworm and blight damage also increases in the wetter months (typically, November to April). Sweetness ratings may decrease significantly during overcast winter periods. In contrast, the vigor and quality of tropical sweet corn varieties such as Hawaiian Sugar, Pajimaca, and Chiripo Dulce are affected only slightly by shortened winter daylengths.

Hybrids Hawaii H38 and Hawaii H68 have yielded well under a wide range of conditions in Hawaii and are shortened less than 25 percent by winter

FIGURE 4. Hawaiian sweet corn hybrid Hawaii H68 growing in April in Waimanalo Experimental Farm. Mr. Herbert S. Waki, Farm Manager, holds 8-foot measure.

daylengths. Winter yields of Hawaii H38 and Hawaii H68 at low elevations exceeded by 15 to 85 percent those of Golden Security (check variety) in 2-years' tests. Days to harvest (at low elevations) vary between 63 and 75 days for Hawaii H38 and between 66 and 78 days for Hawaii H68. Prolonged cool weather at elevations above 1000 feet can delay harvest to more than 100 days. Pericarp thickness under these conditions increases significantly and blight damage increases.

SEEDSTOCKS AND SEED PRODUCTION

Seeds of Hawaii H38 and Hawaii H68 are available from the University of Hawaii, Department of Horticulture. Small amounts of seed of the inbred AA8 may also be obtained. Seed production in Hawaii should be made with AA8 as female parent, planted 7 to 10 days prior to the male parent. It is unlikely that AA8 would flower early enough for seed production in Corn Belt states.